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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/613,951 | 07/11/2000 | Robert G. Wendt | TPG 306 | 1942 |

7590 09/21/2004

Kolisch Hartwell Dickinson
McCormack & Heuser
Suite 200
520 S W Yamhill Street
Portland, OR 97204

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| EXAMINER |
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PAIK, SANG YEOP

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| ART UNIT | PAPER NUMBER |
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3742

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/613,951

Applicant(s)

WENDT ET AL

Examiner

Sang Y Paik

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2004.
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36-66 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 36-66 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 36, 38-40, 44 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baron et al (US 4,401,052) in view of Kushiya et al (US 6,092,669).

Baron et al shows a vapor deposition diffusion system for making solar cells having a substrate strip moving through a evaporation chamber with three serially located heated manifolds made of graphite or boron nitride including substantially closed vessels where each manifolds having an array of vapor delivery nozzles creating a fog to uniformly deposit the source material to the substrate strip. However, Baron et al does not disclose that each manifolds contains different source materials in their respective vessels.

Kushiya et al shows providing three different source materials such as copper, gallium and indium for sputtering or depositing the source materials to a substrate when making solar cells. In view of Kushiya et al, it would have been obvious to one of ordinary skill in the art to adapt Baron et al with each manifolds having different source materials to make solar cells that are high in light absorbing.

With respect to claim 40, Baron et al further shows a thermal shield such as a tantalum foil around the manifold. With respect to claim 54, Baron et al teaches that the deposition rate as well as uniformity of deposition depends with the geometry of the nozzle among other factors,

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and it would have been obvious to one of ordinary skill in the art to adapt the discharge opening of the nozzles within the claimed range or any other range that will meet the desired deposition rate and the uniformity.

3. Claims 37, 47-53 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baron et al in view of Kushiya et al as applied to claims 36, 38-40, 44 and 54 above, and further in view of Chow (US 5,031,229).

Baron et al in view of Kushiya et al discloses the device claimed except having a heating system to maintain the nozzle at a temperature higher than the source material.

Chow shows an evaporating manifold or vessel made of boron nitride with a lid having a plurality of nozzle that is provided with an electrical U-shaped heating system for heating the nozzle at the temperature higher than the body of the vessel (also, see column 6, lines 6-33).

In view of Chow, it would have been obvious to one of ordinary skill in the art to adapt Baron et al, as modified by Kushiya et al with the heating system to provide a higher temperature than the body of the vessel to keep the evaporated material from condensing.

With respect to claim 50, it would have been obvious to one of ordinary skill in the art to modify the distance between the nozzles within the claimed range to modify the deposition rate and the uniformity of the deposition surface.

4. Claims 41-43, 45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baron et al in view of Kushiya et al and Chow as applied to claims 36-40, 44, 47-55 above, and further in view of Finicle (US 5,158,750).

Baron et al in view of Kushiya et al and Chow discloses the device claimed except plural insulation layers.

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Finicle shows a vessel or crucible having a thermal control shield around the vessel including an outer shell made of ceramic material such as graphite and a plurality of insulation layers. In view of Finicle, it would have been obvious to one of ordinary skill in the art to adapt Baron et al, as modified by Kushiya et al and Chow, with the plurality of insulation layers to further protect the vessel.

5. Claims 56-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baron et al in view of Kushiya et al and Chow as applied to claims 36-40, 44, 47-55 above, and further in view of Matsuda et al (US 5,571,749).

Baron et al in view of Kushiya et al and Chow discloses the device claimed including the crucibles, the nozzles, the nozzle heating system, the thermal control shield except having a roll assembly to continuously supply a strip material.

Matsuda et al shows a roll assembly where a substrate strip is fed through an evaporation chamber for chemical deposition. In view of Matsuda et al, it would have been obvious to one of ordinary skill in the art to adapt Baron et al, as modified by Kushiya et al and Chow, with a roll assembly to feed a strip for a continuous process of the vapor deposition.

Response to Arguments

6. Applicant's arguments filed 6/14/04 have been fully considered but they are not persuasive. The applicant argues that there is no motivation to combine Baron et al and Kushiya et al. This argument is not deemed persuasive. Both Baron et al and Kushiya et al are in the same field of endeavor which is in the production of coating thin-film solar cells. Furthermore, Baron shows three vessels located serially along the process path of the thin-film, and Kushiya et al also shows three serially arranged targets in the sputtering area where the thin-film is processed

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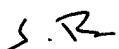
there through. Kushiya et al shows different materials in each of the targets to produce a thin-film that has a light absorbing layer that has high conversion efficiency. Baron et al shows the all the structure except the manifold vessels containing different materials, and in view of Kushiya et al, it would have been obvious to adapt Baron et al to modify its vessels to contain different materials to process a thin-film as done in Kushiya et al to produce a desired thin-film substrates that includes but not limited to a thin-film that is high in light absorbing and high in conversion efficiency. The cover-lapping flumes is created with the manifold vessel arrangement shown in Baron et al, and the use of different materials is shown by Kushiya et al. Thus the applicant's arguments are not deemed persuasive.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Y Paik whose telephone number is 703-308-1147. The examiner can normally be reached on M-F (9:00-4:00) First Friday Off.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sang Y Paik
Primary Examiner
Art Unit 3742



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